

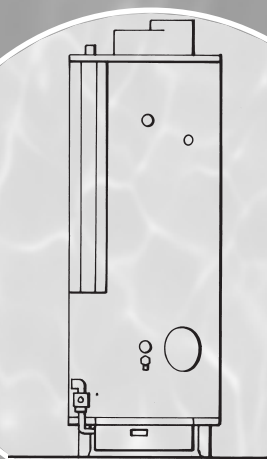
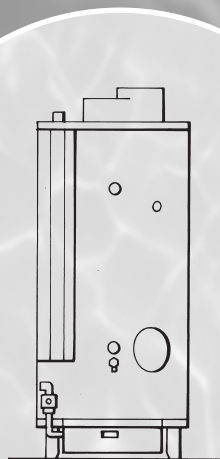


**ANDREWS
WATER HEATERS**

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**ANDREWS
WATER HEATERS**



**INSTALLATION
GUIDE,
OPERATION
AND SERVICE
MANUAL**

**NATURAL GAS,
PROPANE & BUTANE
FIRED STORAGE
WATER HEATERS**

MODELS

CSC 39

CSC 59

CSC 78

CSC 93

CSCL 39

CSCL 59

CSCL 78

CSCL 93

Auto Ignition

THIS MANUAL MUST BE KEPT WITH THE APPLIANCE

Part No. E191



Reproduction of any information in this publication by any method is not permitted unless prior written approval has been obtained from Andrews Water Heaters.

Andrews Storage Water Heaters have been designed and manufactured to comply with current International standards of safety. In the interests of the health and safety of personnel and the continued safe, reliable operation of the equipment, safe working practices must be employed at all times. The attention of U.K. users is drawn to their responsibilities under the Health and Safety Regulations 1993.

All installation and service on the Andrews Water Heater must be carried out by properly qualified personnel, and therefore no liability can be accepted for any damage or malfunction caused as a result of intervention by unauthorised personnel.

The Andrews Water Heaters policy is one of continuous product improvement, and therefore the information in this manual, whilst completely up to date at the time of publication, may be subject to revision without prior notice.

Further information and assistance can be obtained from:

Andrews Water Heaters

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**THE ANDREWS WATER HEATERS COVERED IN THIS MANUAL
ARE FOR USE WITH NATURAL GAS OR LPG (PROPANE OR BUTANE) GAS ONLY**

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GENERAL INFORMATION

The Andrews Water Heater has been designed for use with NATURAL GAS OR LPG (PROPANE OR BUTANE) GAS only and is manufactured to give an efficient, reliable and long service life.

To ensure the continued, trouble-free operation of your heater at maximum efficiency, it is essential that correct installation, commissioning, operation and service procedures are carried out strictly in accordance with the instructions given in this manual. By law, installation and commissioning of the heater must be carried out by properly qualified personnel.

The heater(s) must be installed in accordance with the following requirements;
The current GAS SAFETY (INSTALLATION AND USE) REGULATIONS
The current BUILDING REGULATIONS
The WATER SUPPLY (WATER FITTINGS) REGULATIONS 1999

Additionally, installation should be performed in accordance with all relevant requirements of the Gas Supplier, Local Authority and recommendations of the British Standards and Codes of Practice detailed below.

BRITISH STANDARDS AND CODES OF PRACTICE

STANDARD RANGE

BS 6700: 1997	Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages. This standard supersedes the following British Standards and Codes of Practice: CP99, CP310, CP324, 202, CP342 Part 2, Centralised Hot Water Supply.
BS 5440:2000	Installation of flues and ventilation for gas appliances of rated output not exceeding 60kW.
BS 6644	Installation of gas fired hot water boilers of rated inputs between 60kW and 2MW.
BS 5546:1990	Installation of gas hot water supplies for domestic purposes.
BS 6891	Installation of low pressure gas pipework of up to 28mm in domestic premises.
BS 7206:1990	Specification for unvented hot water storage units and packages.
I/M2	Purging procedures for industrial and commercial gas installations.
I/M11	Flues for commercial and industrial gas fired boilers and air heaters.
I/M16	Notes on installation of gas pipework (excluding 25mm and below).

NOTE: Consideration should be given to amendments or updates to the above standards.

It is the duty of manufacturers and suppliers of products for use at work to ensure, so far as is practicable, that such products are safe and without risk to health when properly used and to make available to users, adequate information about their safe and proper operation.

Andrews Water Heaters should only be used in the manner and purpose for which they were intended and in accordance with the instructions in this manual. Although the heaters have been manufactured with paramount consideration to safety, the basic safety precautions highlighted in this manual must be observed by the user.

It is imperative that all users of the heater must be provided with all the information and instruction necessary to ensure correct and safe operation.

Water systems in buildings have been associated with outbreaks of Legionnaires' Disease, particularly in health care facilities where occupants are significantly more susceptible to infection.

In recognition of the risks in hospitals, a Code of Practice for the Control of Legionellae in Health Care premises has been issued by the Department of Health (1991). Codes of Practice applicable to other premises have been published by other organisations, principally the Health and Safety Executive (HS)(G70) and the Chartered Institute of Building Services Engineers (CIBSE, TM13).

All Codes of Practice draw attention to the design and operation of water systems with reference to avoidance of factors that favour colonisation by Legionellae bacteria. These factors include stagnation, lukewarm conditions (20°C to 45°C) and the accumulation of debris, scale and corrosion in the base of tanks and calorifiers.

Andrews Water Heaters has commissioned an independent evaluation of their products to investigate their resistance to build-up of legionellae bacteria.

Experiments were conducted to determine whether, following a substantial challenge by legionellae pneumophila, after overnight and stagnation conditions, the system was rendered free from viable recoverable legionellae. It was found that at 61°C, following a challenge of approximately 107 organisms per litre, within one hour, more than 99.999% of organisms had been killed. After a subsequent stagnation period, sampling did not reveal any residual contamination. The design of the base of the water heater precludes legionellae colonisation, even after build-up of debris. The burner positioning ensures that the water at the bottom of the heater reaches the same, or higher temperature as in the rest of the heater.

Based on data obtained through experiment, the Andrews Water Heater can be described as legionellae resistant as it is considered unlikely that, at the temperature tested, the organism would colonise the water heater and present a possible health risk.

HEALTH AND SAFETY REGULATIONS 1993

EFFECTIVENESS IN COMBATING LEGIONELLAE

DIMENSIONS AND CLEARANCES

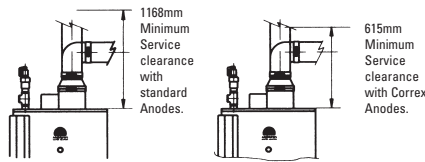
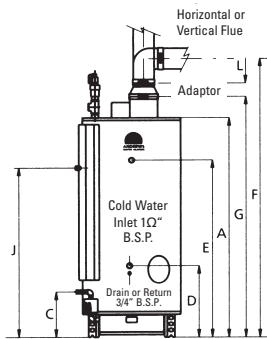
		CSC39 CSCL39	CSC59 CSCL59	CSC78 CSCL78	CSC93 CSCL93
Storage Capacity	l gal	276 61	276 61	276 61	350 77
Recovery thro' 44°C/80°F	l/h gal/h	749 165	1149 253	1517 334	1808 398
Recovery thro' 56°C/100°F	l/h gal/h	600 132	922 203	1213 267	1445 318
Heat Input	kW Btu/h	44 150,128	66 225,192	88 300,256	106 361,672
Heat Output	kW Btu/h	38.7 132,044	59.4 202,673	78.3 257,159	93.3 318,339
Gas Flow Rate	m³/hr ft³/hr	4.09 144.6	6.15 217.2	8.20 289.8	9.88 349.2
Gas Flow Rates LPG	m³/hr ft³/hr	1.78 63	2.54 90	3.39 120	4.09 144.6
Gas Family		1 ₂ H NATURAL and 1 ₃ LPG			
Feed /Flow Connections	Rp (BSP)	1½	1½	1½	1½
Return Connections	Rp (BSP)	¾	¾	¾	¾
Gas Connection	Rp (BSP)	¾	¾	¾	¾
Fuel Gas Temperature	°C	132	132	171	171
Fuel Gas Volume	m³/hr	110	109	140	164
Max. Working Pressure	bar lbf/in²	10 150	10 150	10 150	10 150
Min. Working Pressure	bar lbf/in²	0.15 2.2	0.15 2.2	0.15 2.2	0.15 2.2
Burner Pressure Natural Gas	mbar ins wg.	11.25 4.5	11.25 4.5	11.25 4.5	11.25 4.5
Burner Pressure Propane & Butane	mbar ins wg.	25 10	25 10	25 10	25 10
Injector Diameter (Natural Gas)	mm in	2.4 0.094	2.9 0.114	2.9 0.114	3.1 0.122
Injector Diameter (LPG)	mm in	1.65 0.064	1.95 0.076	1.90 0.074	2.1 0.082
Weight Empty	kg Lb	340 750	340 750	345 760	381 840
Weight Full	kg Lb	636 1402	636 1402	641 1412	727 1603
Shipping Weight	kg Lb	354 780	354 780	358 790	399 880
Shipping Dimensions Height	mm in	2110 83	2110 83	2110 83	2110 83
Shipping Dimensions Width	mm in	770 30	770 30	770 30	770 30
Shipping Dimensions Depth	mm in	1210 47	1210 47	1210 47	1210 47
Mains Voltage	V	220/240 - IP 20			
Frequency	Hz	50			
Fuse	A	5			

Control Package:

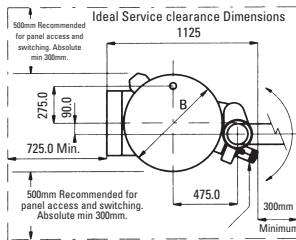
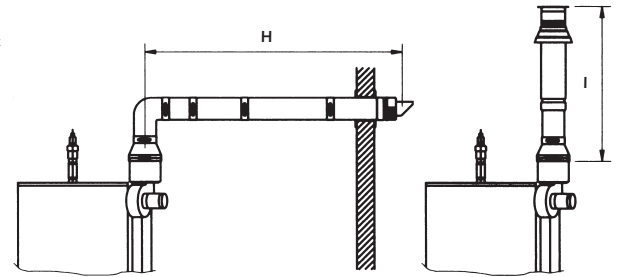
Pactrol integrated board
intermittent pilot system. White
Rogers 11B79-15 Aquastat with
manual reset ECO.
Gas Valve Honeywell VR8304H.
Alternate: Johnson Controls
G770 Ignition Module (LPG).

Induced Draft Blower:

Fasco 7182-6453C;
230V/50Hz.
Sealed shaft and seams.

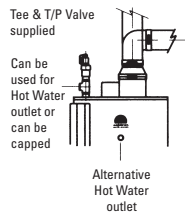


CSC39 and CSC59 Alternative Flue Systems

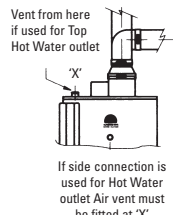


N.B. Access of 500mm must be provided one side for 6 months fan lubrication

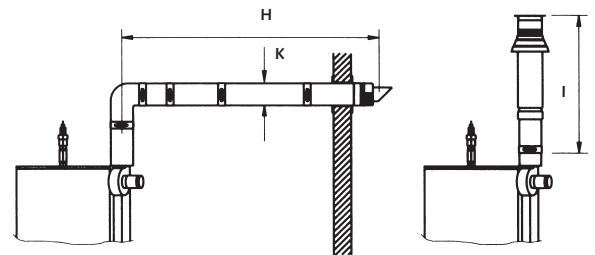
UNVENTED SYSTEM



VENTED SYSTEM



CSC78 and CSC93 Alternative Flue Systems



ANDREWS MODEL NO.		CSC39	CSC59	CSC78	CSC93
A. Height of Heater	mm In	1623 64	1623 64	1623 64	1851 73
B. Diameter	mm In	720 28	720 28	720 28	720 28
C. Gas Connection	mm In	355 14	355 14	355 14	355 14
D. Cold Inlet	mm In	530 21	530 21	530 21	530 21
E. Optional Front Outlet	mm In	1307 51	1307 51	1535 60	1535 60
F. Height to Centre of Flue	mm In	2060 81	2060 81	1980 78	2217 87
G. Height to Flue Spigot	mm In	1780 70	1780 70	1780 70	2020 80
H. Min. Flue Horizontal	mm In	1100 43	1100 43	1260 50	1260 50
Max. Flue Horizontal	mm In	7000 276	7000 276	7000 276	7000 276
I. Min. Flue Vertical	mm In	1310 51	1310 51	1610 63	1610 63
Max. Flue Vertical	mm In	7000 276	7000 276	7000 276	7000 276
J. Electrical Connection	mm In	1250 49	1250 49	1250 49	1480 58
K. Flue Diameter	mm	100/150	100/150	130/200	130/200
L. Flue Adaptor	mm In	95 4	95 4	Not supplied with these models	

DIMENSIONS AND CLEARANCES

INTRODUCTION

THE LAW REQUIRES THAT INSTALLATION IS CARRIED OUT BY A PROPERLY QUALIFIED PERSON

Installations must be carried out in accordance with Gas safety (Installation and Use) Regulations 1998, Building Regulations, The Water Supply (Water Fittings) Regulations 1999 and any requirements of the local Gas Authority, Local Authority, Water and Fire Authorities and the current British Standards and Codes of Practice listed in Section 1.

LOCATION

The location selected for installation of the heater must allow the provision of a satisfactory flue, adequate air supply, drain facilities and must be well illuminated.

A purpose built boiler room or compartment is strongly recommended.

A manual valve for isolation of the boiler room should be installed in the gas supply; it should be clearly identified and readily accessible for use at all times.

If a purpose built boiler room is not available, measures should be taken to protect the heater from damage and prevent any extraneous matter from being stored on or around the heater. See BS 6644 Clauses 4, 5 and 6 for details.

The heater must not be installed in any location which contains a bed, bath or shower. There must be easy access to the boiler room and heater at all times.

The water heater must be located in an area where leakage from the tank, water connections or the combination temperature and safety valve will not result in damage to the area adjacent to the water heater. When such locations cannot be avoided, a suitable drain tray must be installed under the water heater. The drain tray must be no deeper than 38mm (1.5in) and have a minimum length and width of 100mm (4in). The drain tray must be piped to an adequate drain using 20mm (0.75in) diameter pipe, angled for proper drainage.

Access must be provided to the front of the water heater and adequate clearance for it's servicing and operation.

The floor on which the heater is installed must be flat, level and of sufficient strength to withstand the weight of the heater when filled with water, and should satisfy the requirements of the Local Authority & Building Regulations.

Any Combustible material adjacent to the heater must be so placed and shielded as to ensure that it's temperature does not exceed 66°C (150°F).

The minimum clearance to combustibles for the heater is:
50mm (2in) from the front of the burner access box.
Zero clearance from the air intake boot and vent tubes.
300mm (12in) from the direct vent terminal.

A minimum of 726mm (30 inches) from the burner access panel shall be provided for inspection and servicing.

All service clearances to the water heater must be maintained as specified in the CSC Range Installation and Design Guide.

The installation of the gas supply must conform, depending on its size, to the requirements of British Standards and Codes of Practice listed in Section 1 of this manual.

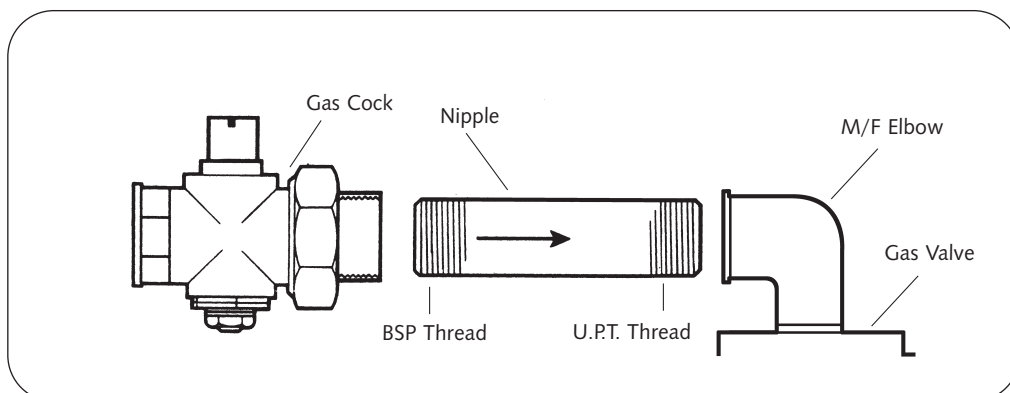
A gas meter will be connected to the service pipe by British Gas plc or its authorised contractor.

The meter and service pipe should be checked by British Gas or its authorised contractor to ensure that they are adequate to deal with the gas supply to the water heater(s) in addition to any existing or additional requirements.

CAUTION!

DO NOT APPLY HEAT IN CLOSE PROXIMITY TO THE GAS CONTROL THERMOSTAT AS THIS WILL RESULT IN DAMAGE OCCURRING TO THE CONTROL.

Fit the gas cock immediately upstream of the gas control valve using a suitable jointing compound and connect to the gas supply. An inlet nipple and m/f elbow is factory fitted to the gas control valve to avoid possible damage.

**Fig 1.**

Where the water heater(s) is(are) installed in a boiler house or purpose built compartment, a manually operated valve for the boiler house must be fitted in accordance with the Gas Safety (Installation and Use) Regulations 1998. The valve must be easily identified and readily accessible.

After installation, the system should be pressure tested for soundness and purged in accordance with BS 6891 or IM/2 and IM/5 as appropriate.

**GAS SUPPLY
PROPANE OR
BUTANE**

Contact Calor Gas who will provide the appropriate type and size of LPG supply vessel and ensure it's safe location and installation.

The installation of the gas supply must conform to LPGA Code of Practice, 22 LPG Piping Systems: Design and installation plus the requirements of British Standards and Codes of Practice listed in Section of this manual.

Andrews water heaters are unregulated and a second stage regulator must be installed to give an inlet pressure to the appliance as follows: (See fig. 2).

PROPANE:	37mbar (14.86 in wg)
BUTANE:	28mbar (11.26 in wg)

When using propane or butane cylinders, connect a minimum number of cylinders as listed below, together with a manifold before connecting to the union.

Use a minimum pipe size of $\frac{3}{4}$ in bore.

Two Cylinders CSC 39 and CSC 59

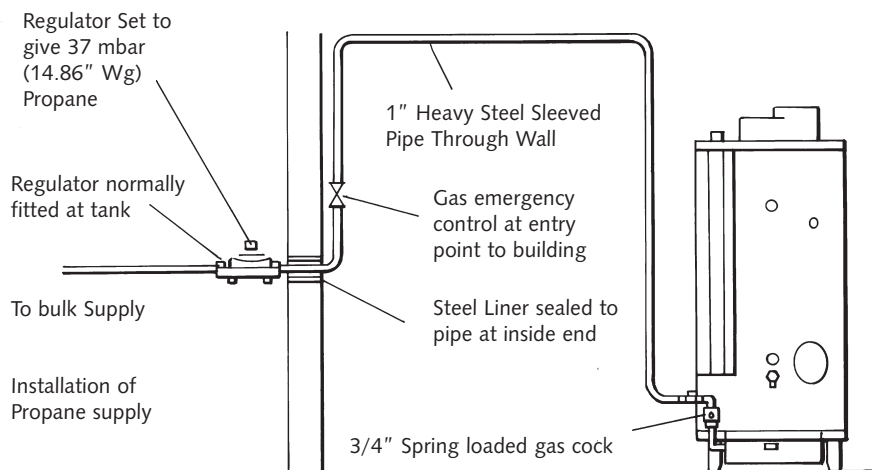
Three Cylinders CSC 78

Four Cylinders CSC 93

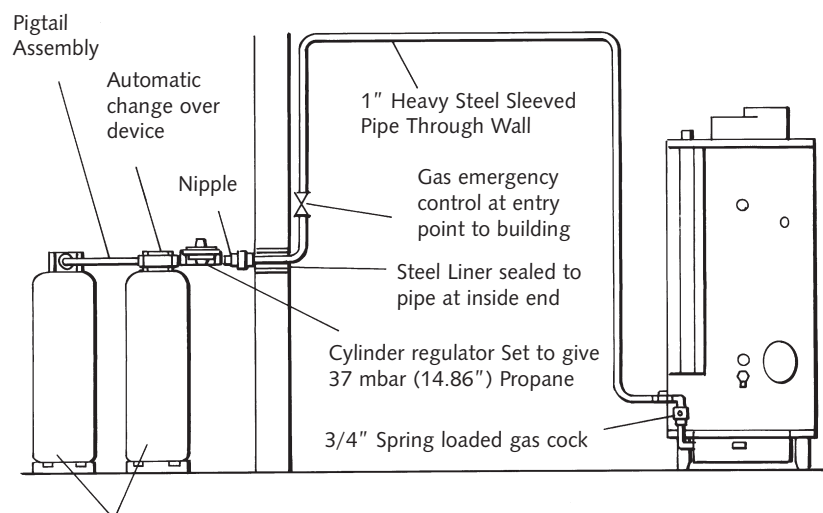
WARNING!

PROPANE AND BUTANE CYLINDERS MUST BE USED AND STORED IN ACCORDANCE WITH 'THE HIGHLY FLAMMABLE LIQUIDS AND LIQUIFIED PETROLEUM GASES REGULATIONS 1972', AND SHOULD COMPLY WITH LPGA CODE OF PRACTICE 7, 'STORAGE OF FULL AND EMPTY LPG CYLINDERS AND CARTRIDGES.

BULK STORAGE VESSEL INSTALLATION



CYLINDER INSTALLATION



Propane cylinder must be outside building

Fig 2.

ELECTRICAL SUPPLY

External wiring to the water heater(s) must be installed in accordance with current I.E.E. Regulations for the wiring of buildings and to any Local Regulations that may apply.

The Auto Ignition Heater is designed to operate from a 220/240V, 1Phase supply. The fuse rating is 5 amps.

The method of connection to the mains electricity supply should facilitate complete Electrical isolation of the appliance, preferably by use of a fused double pole switch or fused spur box serving only the heater. The disconnection of the supply shall have a contact separation of 3mm in all poles.

The point of connection to the mains electricity supply should be readily accessible and adjacent to the appliance.

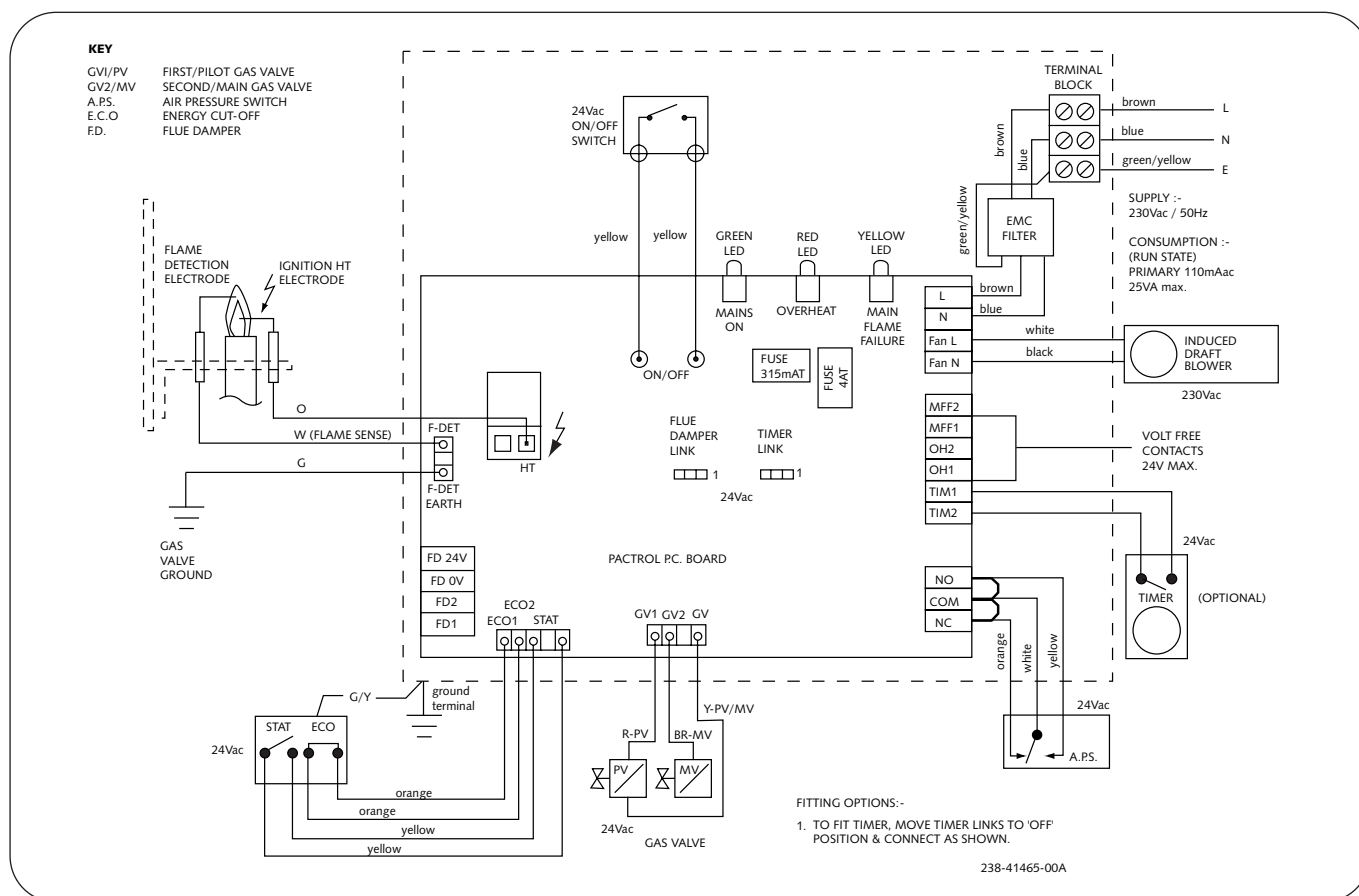


Fig 3.

Wiring diagram for natural gas appliance.

Connect the electrical supply the main control panel terminal block via the cable glands in the base of the control panel. Mains input cable should be 0.75mm², 3 core, and should be connected to the mains supply as detailed above.

It is recommended that screen cable is used where the volt-free contacts are to be connected from an external supply. This will eliminate the risk of possible interference from nearby high voltage cables.

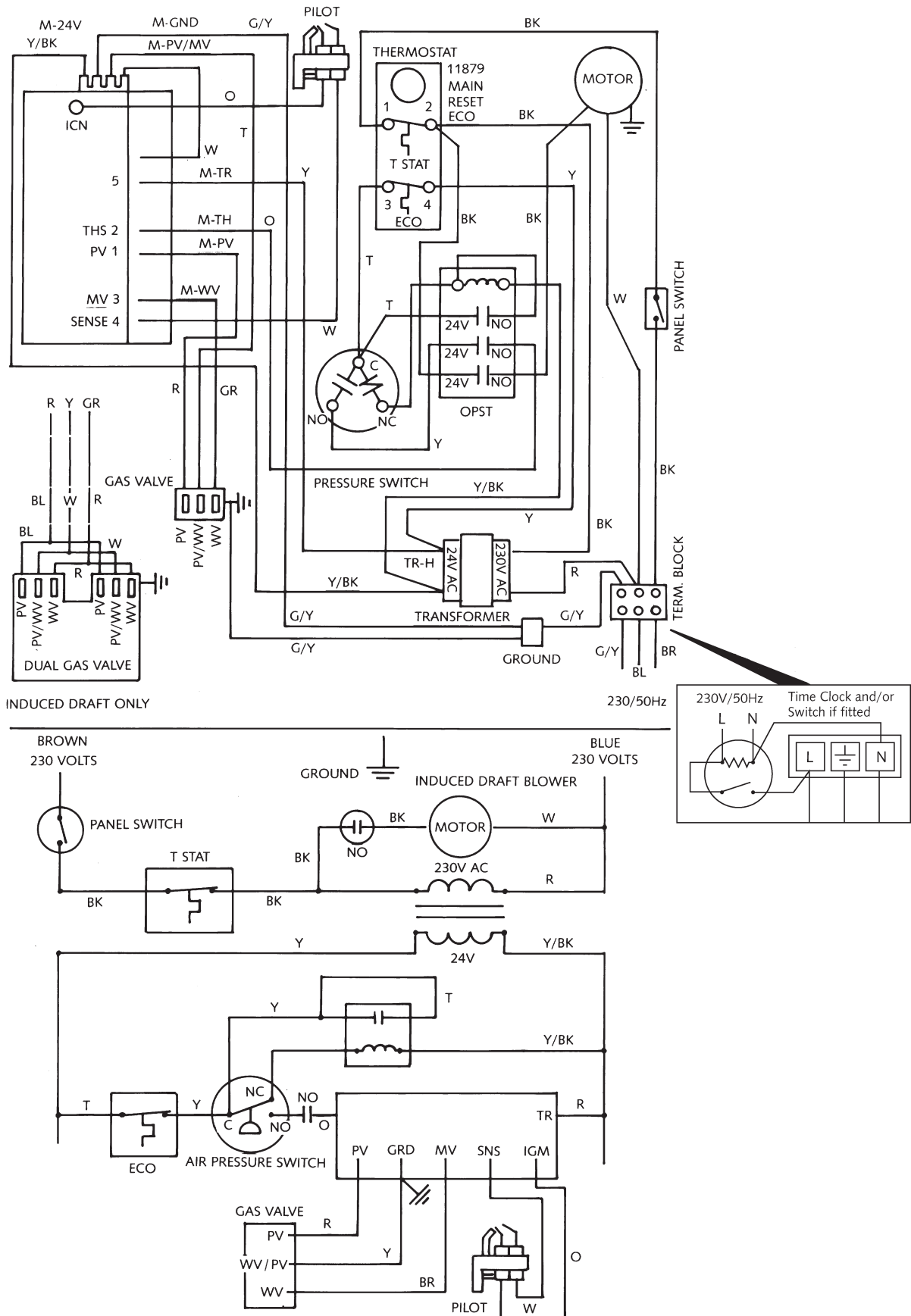
Mains Voltage: 220/240Volts - IP 20

Frequency: 50Hz

Fuse: 5 Amps

Wiring Diagram for LPG Appliance

Fig 4.



FLUE SYSTEMS

Your Andrews Water Heater is a Direct Fan Flued Gas Water Heater where all air for combustion is obtained from the outside atmosphere and all flue gases are charged to the outside atmosphere. The flue system is a single coaxial (pipe within pipe) design where the flue products are discharged through the inside flue tube and the combustion air supply surrounds the flue surrounded by the outside pipe. The flue system incorporates both combustion air supply and the flue exhaust. The flue system component which is outside the building and takes in the combustion air supply and discharges the flue products (whilst keeping them separate) is referred to as the 'direct flue terminal'.

WARNING!

The direct flue system must be properly installed. Failure to do so could result in property damage or personal injury. DO NOT install any damaged components. Contact Andrews Water Heaters for replacement parts. The flow of combustion air must not be restricted. Keep direct flue terminal openings clear of any objects likely to cause flow restriction.

Direct Flue Terminal

Shall terminate at least 1.5m (5ft) above any forced air inlet located on the same wall. This provision does not apply to the combustion air intake of a direct flue appliance or the circulating air inlet and flue gas discharge of listed outdoor appliances.

Shall be installed with at least a 300mm (12in) flue termination clearance from any air opening into a building.

The bottom of the direct flue terminal shall be located at least 300mm (12in) above ground.

HORIZONTAL AND VERTICAL DIRECT FLUE LENGTHS

The Andrews Direct Fan Flued Gas Water Heater is supplied with one direct flue kit. The flue system supplied with this water heater is a coaxial design with the flue discharge tube on the inside and combustion air supply on the outside. Optional direct flue components are available that can extend the horizontal length and/or vertical height of the direct flue to the maximum distances listed in the table below. This water heater must be installed using the supplied or optional listed components without modification. Refer to the table on Page 37 for the various vertical and horizontal direct flue system components.

NOTE! The supplied horizontal flue terminal may be used through outside walls up to 600mm (24in) thick.

Maximum Flue Distances (Horizontal or Vertical)

Number of 90° Elbows	Maximum length of straight pipe (excluding vent terminal) to exterior wall
0	7m (22ft 9in)
1	6m (19ft 6in)
2	5m (16ft 3in)
3	4m (13ft 0in)

NOTE! Each 45° elbow reduces the maximum flue distance by 500mm (19.5in).

IMPORTANT! Do not exceed the flue distances or the number of elbows listed above. This may cause heater malfunction or an unsafe condition.

Installation Procedure

Determine location of flue exit.

1. The supplied kit includes a horizontal (through the wall) flue terminal, an elbow, flue connector clamps and 2m (6.5ft) of coaxial flue pipe. The 150mm (6in) diameter flue system is also supplied with a 200mm (8in) to 150mm (6in) reducer for the waterheater flue connection. The coaxial flue pipe includes both the flue exhaust (inside pipe) and combustion air (outside pipe). The coaxial flue pipe may be cut on the unflared end (end without gasket) as required for the installation.
2. Determine if additional flue components are required for the installation. Refer to the flue component table below for available optional flue components.
3. Ensure that the flue terminal location complies with requirements described earlier and the Local Gas Authority.
4. Measure the vertical and horizontal distance from the water heater flue connection to determine the number of vent flue needed.

HORIZONTAL AND VERTICAL DIRECT FLUE LENGTHS

Flue Component Table for 150mm (concentric) (6in) Diameter Flue Size (58.7 kWh 199,999 Btu/h Input Models).

SUPPLIED KIT COMPONENTS

Quantity	Flue Length	Part Description	Part Number
1		90° Elbow	E205
1	600mm (24in)	Horizontal Flue Terminal	E236
1		Large Stepped Adaptor Connection Clamp	E237
1		200mm (8in) to 150mm (6in) flue reducer	E238

FLUE SYSTEMS

Optional Components for 150mm (concentric) (6in) Diameter Flue Size

Quantity	Flue Length	Part Description	Part Number
1	1 mtr	Flue Pipe with clamp	E202
1	1 mtr	Cutable Flue Pipe with clamp	E203
1	0.5 mtr	Flue Pipe with clamp	E204
1		90° Elbow	E205
1		45° Elbow	E206
1	1360mm (54in)	Vertical Flue Terminal	E239
1		Flat roof flashing for vertical flue terminal with adjustable cap	E207
1		Roof flashing for pitched roofs 150mm (6in) dia vent size	E208
1		Wall Clamp 150mm (6in) dia.	E209

Flue Component Table for 200mm (concentric) (8in) Diameter Flue Size (88 kWh/300,00 Btu/h and 105.6kW/360,000 Btu/h Input Models.

SUPPLIED KIT COMPONENTS

Quantity	Flue Length	Part Description	Part Number
1		90° Elbow	E215
1	600mm (24in)	Horizontal Flue Terminal	E240
1		Large Stepped Adopter Connection Clamp	E237

Optional Components for 200mm (concentric) (8in) Diameter Flue Size

Quantity	Flue Length	Part Description	Part Number
1	1 mtr	Flue Pipe with clamp	E212
1	1 mtr	Cutable Flue Pipe with clamp	E213
1	0.5 mtr	Flue Pipe with clamp	E214
1		90° Elbow	E215
1		45° Elbow	E216
1		Flat roof flashing for vertical flue terminal with adjustable cap	E217
1		Roof flashing for pitched roofs 150mm (6in) dia flue size	E218
1		Wall Clamp 200mm (8in) dia.	E219

INSTALLING THE FLUE TERMINAL

NOTE! The horizontal flue terminal supplied may be used through outside walls up to 600mm (24in) thick.

1. Horizontal flue Terminal (Through the Wall) supplied

- Cut an opening of at least 165mm (6.5in) diameter through the outside for the 58.7kWh input models or 216mm (8.5in) for the 88kWh and 105.6kWh input models.
- Slide the flue terminal through the wall opening to the rib closest to the intake air openings of the terminal even with the outside wall.

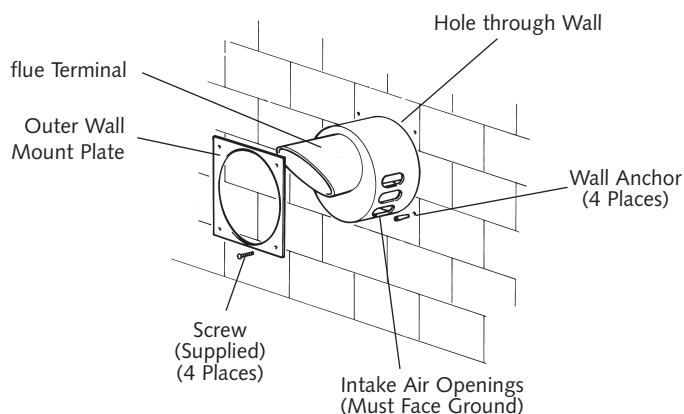


Fig 5.

- Slide the outside wall plate over the flue terminal and fasten to the wall with four screws. Depending on the wall construction, wall anchors may be required to reinforce the screws.
- Install inside wall plate on the inside wall and secure with four screws. Depending on wall construction, wall anchors may be required to reinforce the screws.

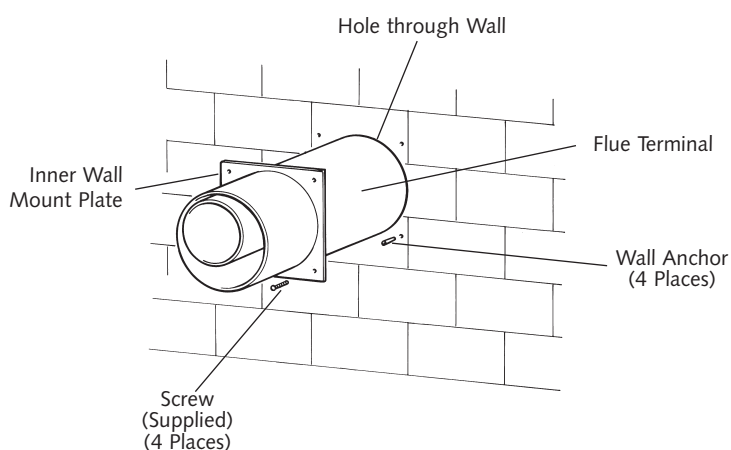


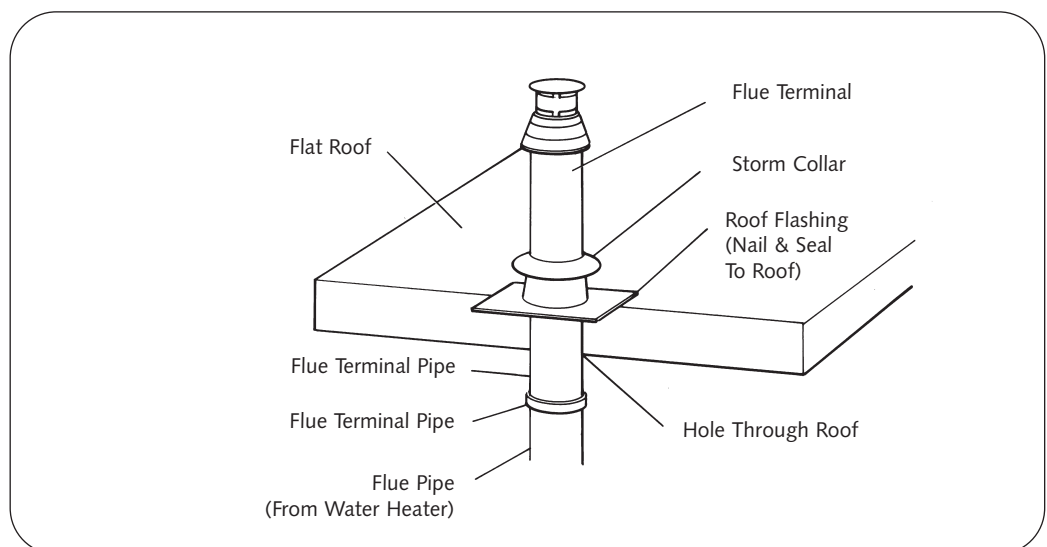
Fig 6.

FLUE SYSTEMS

2. Vertical Flue Terminal (Through the Roof - Optional)

- Determine the exact location where the roof flue terminal will exit the roof, ensuring the flue system clears all obstructions. For pitched roofs, the flue cap must be the distance above the roof line as specified, (300mm to base of Flue Clamp, minimum). The top of the roof terminal may extend up to 760mm (2.5ft) above the roof line as required.
- Run the coaxial flue system to the proper distance below the roof sheathing required for the correct distance of the roof terminal above the roof surface. See the following sections on installing the rest of the flue system.
- Cut a minimum 165mm (6.5in) diameter hole for the smaller flue size or a 216mm (8.5in) minimum diameter hole for the larger flue size centred in the desired location for the roof terminal. See Fig. 7.
- Centre the roof flashing over the hole using either the flat roof flashing or universal flashing for pitched roofs.
- Slip the storm collar supplied with the roof flashing kit over the outside of the flue terminal and align with the flue pipe end below roof opening. Insert the terminal into the flue pipe.
- Fasten the roof flashing with nails. Seal the flue terminal and flashing to the roof.
- Install the gasketed clamp around the joint between the flue terminal and flue pipe.

Fig 7.



INSTALLING FLUE PIPING SECTIONS

- The coaxial flue pipe sections are designed to fit tightly together and seal with the integral flue pipe seal and supplied pipe clamps. No silicone caulk or special tools are required.
- All flue sections and fittings come complete with silicone flue pipe gaskets and outside gasketed pipe clamps for making air tight connections between the flue pipe connections.
- Raise the flue pipe to the flue terminal connection with the gasketed end of the flue pipe towards the flue terminal. Insert the flue pipe into the flue terminal connection and grasp the end of the flue pipe while twisting and pushing the pipe until inserted all the way into the flue terminal.
- Connect the outside pipes together using the gasketed clamps provided. The flue pipes have ribs located near each end. When the flue piping is connected, the gasketed clamps shall cover the ribs and joints of the connecting flue tubes. Support each pipe section with hangers attached to the supporting joists in the wall or ceiling.
- Continue connecting pipe sections together with clamps and supporting with hangers.

FLUE SYSTEMS

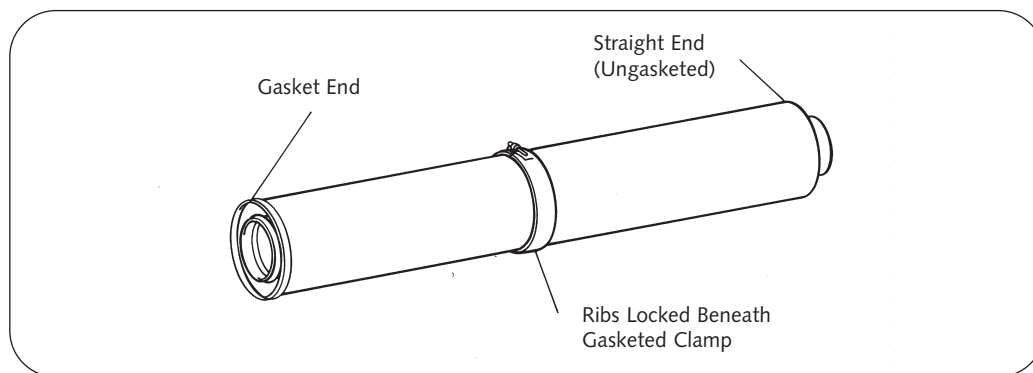


Fig 8.

- g) The last pipe section may be cut to fit the distance required to reach the water heater flue connections. First, install the supplied condensate trap with crimped end into the gasketed end of the elbow (horizontal flue installations) and clamp the condensate tee and elbow together. Then install the crimped end of the elbow into the flue connection of the water heater. On vertical installations, install the the crimped end of the condensate trap directly onto the water heater flue connection. The 58.7kWh models require the installation of a flue reducer (supplied) into the water heater flue assembly before attaching the elbow or condensate trap (vertical flue).

IMPORTANT! In order for the condensate trap to collect and dispose of the condensate from the flue pipe, the flue system must have a downward slope of 21mm per metre (0.25in/ft) towards the condensate trap. The condensate trap must be installed as close as possible to the flue adaptor to prevent condensate from accumulating and draining into the flue adaptor or blower.

- h) Carefully measure the length of straight flue pipe needed, allowing for about 50mm (2in) insertion into the elbow. Mark the ungasketed end of the pipe to be cut and carefully make a straight cut on the outside pipe to the desired length. Make sure the inside tube is not cut. Then cut the inside flue pipe about 50mm (2in) less than the outside pipe so that the flue pipe protrudes slightly beyond the outside pipe. Connect the flue pipe and clamp at each end.
- i) Use the large clamp supplied in the flue kit with the stepped gasket to seal the elbow or condensate trap to the blower flue connector. The larger step of the gasket seals the flue pipe to the cast flue adaptor.
- j) Condensate disposal: Connect either a 32mm (1.25in) slip joint drain connection or a 25mm (1in) PVC compression coupling from the condensate trap nipple to 25mm (1in) PVC piping to a drain or condensate disposal pump. Install a drain trap after the condensate fitting to seal the flue system.

Note: On all flue installations, for distances over 1.5 metres, we recommend that a condensate trap is fitted.

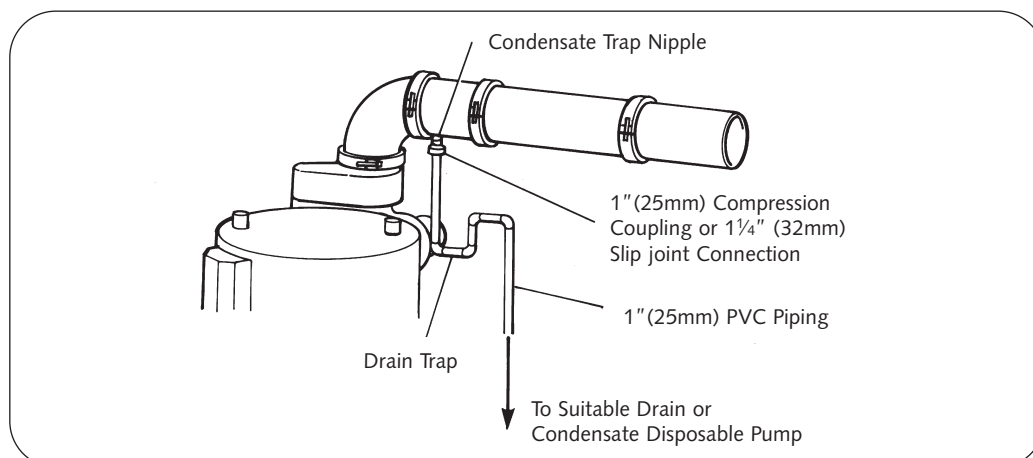


Fig. 9

AIR SUPPLY AND VENTILATION

The following notes are intended to give guidance:

Where the heater is to be installed in a room, NO VENTS ARE REQUIRED.

Where the heater is to be installed in a compartment, permanent air vents are required in the compartment at high and low level. These air vents must either communicate with a room or internal space or be direct to outside air.

The minimum effective areas of the permanent air vents required in the compartment are as follows:

Air Vents Areas

Position of Air Vents	Air from Room or Internal Space	Air Direct from Outside
High Level	10cm ² per kW	5cm ² per kW
Low Level	10cm ² per kW	5cm ² per kW
In a Room or Internal Space	No Requirement for Ventilation	

Note: - Both air vents must communicate with the same room or internal space or must both be on the same wall to outside air.

Air vents should have negligible resistance and must not be sited in any position where they are likely to be easily blocked or flooded or in any position adjacent to an extraction system which is carrying flammable vapour.

Consideration must be given to the position of the high level ventilation opening. A high level vent must not be sited within 300mm (1ft) measured vertically, of the flue terminal.

Grilles and louvres should be so designed that high velocity air streams do not occur within the space housing the heater(s).

The grilles should have a total minimum free area for the water heater(s) in addition to any other requirements as follows: -

- **Low Level (inlet)**
540cm² plus 5cm² per kilowatt in excess of 60kW total rated input.
- **High Level (outlet)**
270cm² plus 2.5cm² per kilowatt in excess of 60kW total rated output.

IMPORTANT:

1. The effective area requirements specified in the table are related to the maximum heat input of the heater(s), and are equivalent to those specified in BS6644.
2. The free area of the grilles should not be less than the size of the recommended ventilation opening.
3. The supply of air to a space housing the heater(s) by mechanical means should be:-
 - (a) Mechanical inlet with natural extraction.
 - (b) Mechanical inlet with mechanical extraction.

NB!! Natural inlet with mechanical extraction must not be used.

Where a mechanical inlet and mechanical extraction system is used, the design extraction rate must not exceed one third of the design inlet rate.

All mechanical ventilation systems must be fitted with automatic gas shut off safety systems which cut off the supply of gas to the heater(s) in the event of failure of either the inlet or extract fans.

The requirements for air supply by mechanical ventilation are given in BS6644 Clause 19.3.

The permanent air vents shall be sited away from the extract fans. It may be necessary to increase the ventilation area to compensate for the extractor fan.

**AIR SUPPLY
AND
VENTILATION**

WATER QUALITY AND TREATMENT

Where extreme conditions of water hardness exist, scale can form in any water heating equipment, especially when the heater is working under conditions of constant heavy demand and at high temperatures.

Each water heater is fitted with one or more magnesium anode(s) which protects the tank from corrosion caused by electrolytic action. Magnesium anodes are sacrificial in that they corrode as they protect. When the anode has eroded to less than 50% of its original diameter, it may not offer protection. The anodes should be inspected annually and replaced as necessary. Frequency of anode replacement will vary, dependent on water quality.

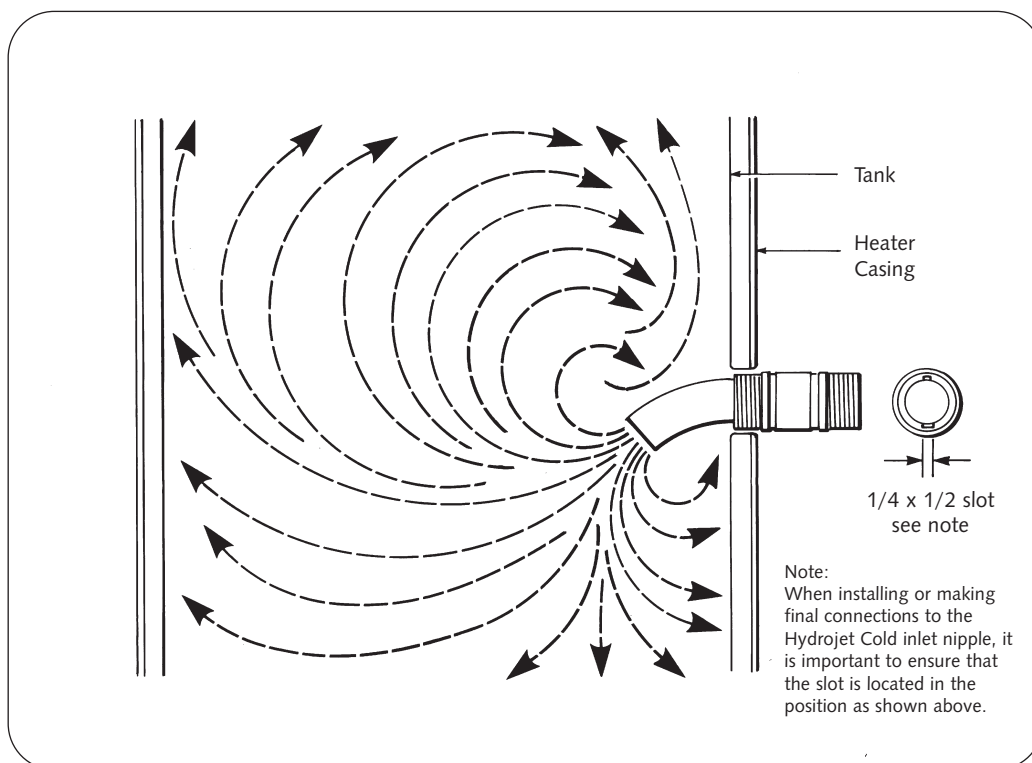
Andrews Water Heaters offer Correx™ UP powered anodes as an alternative to the standard magnesium anodes. These anodes do not need maintenance or replacement. The potentiostat which regulates the current to the Correx™ anode features an indicator light which shows green to indicate the correct function and red to indicate the malfunction. These anodes are available as an optional extra on all Andrews heaters.

In hard water areas, scale formation can occur in hot water systems and hot water heaters and the higher the temperature and volume of water used, the more problematic the scale build-up can be. Water treatment is normally recommended when the hardness reaches 100 - 150ppm (7 - 10 degrees Clark) and above. This problem can be minimised by reducing the water temperature in the heater and by fitting suitable water pre-treatment equipment.

When installing Andrews Water Heaters in hard water areas we would recommend that a water treatment specialist is consulted.

Hydrojet System

Hydrojet Inlet Nipple (Front Cold Inlet Connection)



The heater is fitted with the Hydrojet Total Performance System incorporated in the cold inlet nipple. The system is designed to increase turbulence and reduce sediment build-up, reduce thermal stacking and increase delivery.

**WATER
CONNECTIONS
VENTED SYSTEMS**

The water heater must be fed from a cold water feed cistern or static water tank.

A safety valve must be fitted as specified in BS 6644 Clause 9.

The safety valve must be fitted either directly to an upper tank tapping or not further than 1 metre along the outlet flow pipe of size not less than the safety valve.

There must be no valve separating the heater from the safety valve.

The size of the discharge pipe must be not less than the nominal size of the safety valve outlet. It should be self-draining and any water discharged must be visible and create no hazard to persons in or about the building.

A low pressure open vented system can be used or where the natural circulating pressure is insufficient, pumped circulation can be employed.

The heater must be fitted with an open vent pipe which is not valved and which rises continuously to the open vent. It should be sized with reference to Technical Data, BS 6644 Clauses 9 and 10 and CP 342. Local Regulations and Bye-Laws must be observed when installing the system.

Front Cold inlet / Top Hot outlet water connections / Optional Front Hot outlet water connection

Select the hot outlet location required, and using a suitable jointing compound blank off the outlet not required. We recommend that the top hot outlet water connection is used.

Assemble onto the $\frac{3}{4}$ BSP thread, the $\frac{3}{4}$ BSP coupler socket and drain cock using a suitable jointing compound.

Water draw-off dead legs should comply with CP 342 Part 2, Table 1 and BS 6700.

NOTE:

When using a secondary return circuit, see Fig 10 for the location of the return tappings.

It is recommended that all water connections be made to the heater(s) using union fittings for ease of servicing. Pipe support intervals should comply with CP 342, Part 2 Table 4.

After Installation of the water system, open the main water supply valve, flush the system and fill the heater. Open the hot taps to allow air to escape from the system. When the system is free of air, close the taps and check for leaks at the thermostats, drain cock and pipe connections on the heater.

Typical water service layout for a vented system is shown in Fig 10.

WATER CONNECTIONS

VENTED SYSTEMS

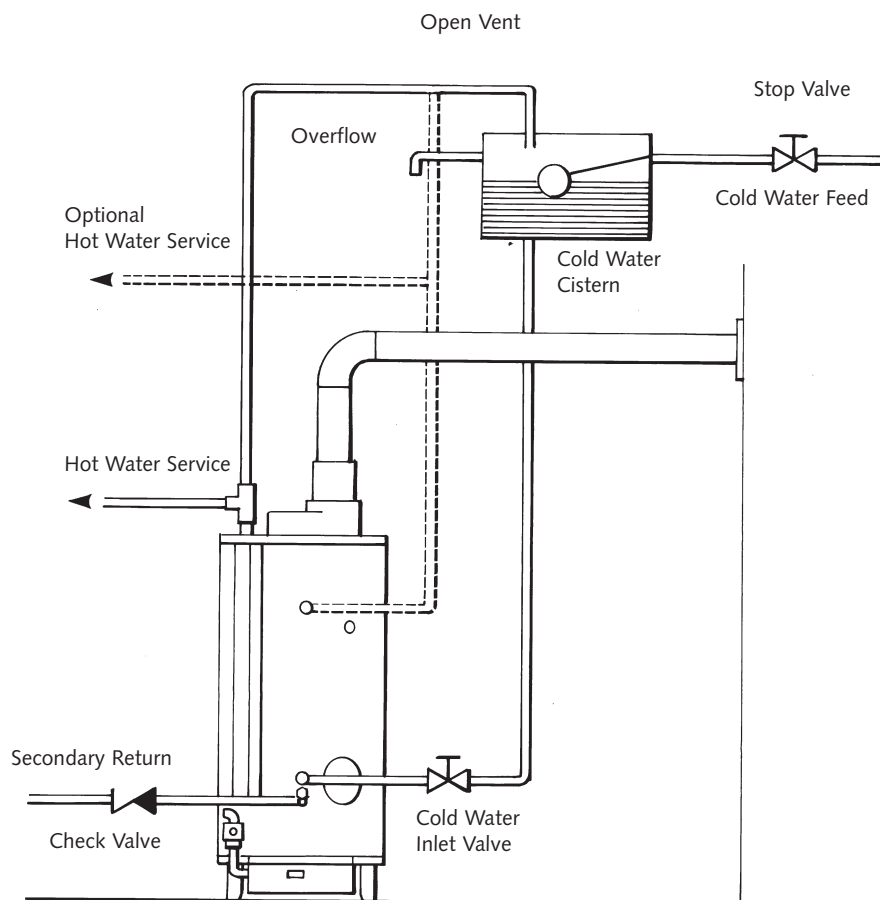


Fig 10.
Typical Installation
Vented System

Unvented Systems should be fitted by an Approved Installer

When used in an unvented system, the Andrews water Heater will supply hot water at a pressure of 3.5bar (51lbf/in²), provided that this pressure is available at the mains feed. During conditions of no-flow, system pressure may rise to a maximum of 6bar (87lbf/in²) whilst the burner is operating. When testing the system, it is recommended that a maximum test pressure of 8.6bar (125 lbf/in²) is employed.

The heater can be used on unvented hot water storage systems, with the addition of an Unvented Systems Kit, part number B228 or B248 available from Andrews Water Heaters. See Parts List Pages 38/39. The Wall mounting assembly is available as an optional extra.

WATER CONNECTIONS UNVENTED SYSTEMS

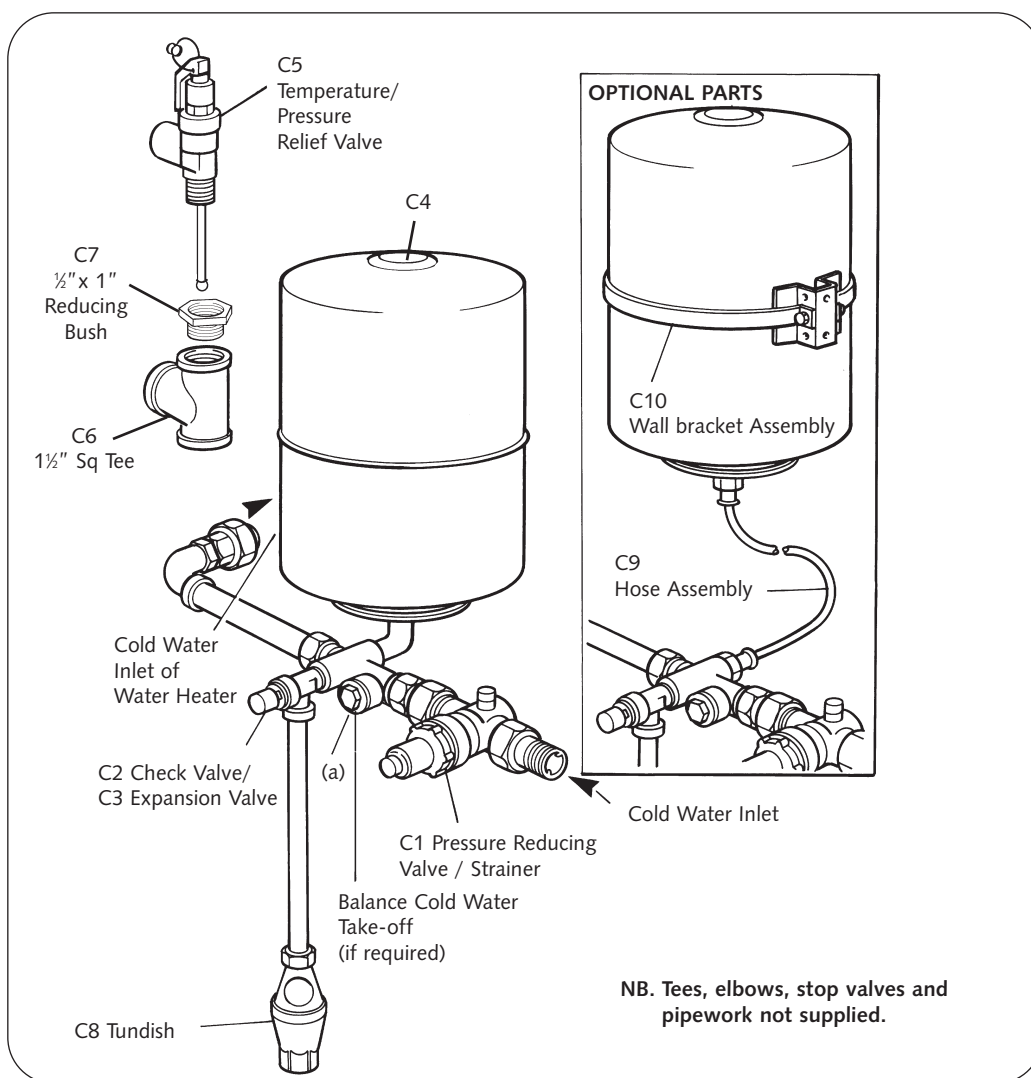


Fig 11.

Item C5 must be fitted into C6 and C7 as required and fitted on the hot water outlet nipple (See fig.12).

When assembling items C1 and C2, ensure that the flow arrows marked on the components are pointing in the direction of flow, i.e. towards the water heater.

The cold water for services may be drawn from the 22mm compression port on item C1(a). The water pressure at this point will be similar to that available at the hot water outlet of the water heater. If port (a) is not used, it should be sealed with the blanking plug supplied.

WATER CONNECTIONS

If higher flow rates are required for the cold water services, a suitable tee fitting should be fitted to the pipework, upstream of item C1.

The pipework fitted to the tundish outlet should be one size larger than the outlet pipe of the safety device and should be terminated at a suitable drain.
(See Building Regulations 1992 Approved Document G3).

All fittings and materials must be suitable for use with drinking water and listed in the current Water Research Centre "Materials and Fittings Directory".

Installation of unvented hot storage water systems must comply with Part G3 of the Building Regulations 1992.

Typical water service layout for unvented system is shown in Fig 12.

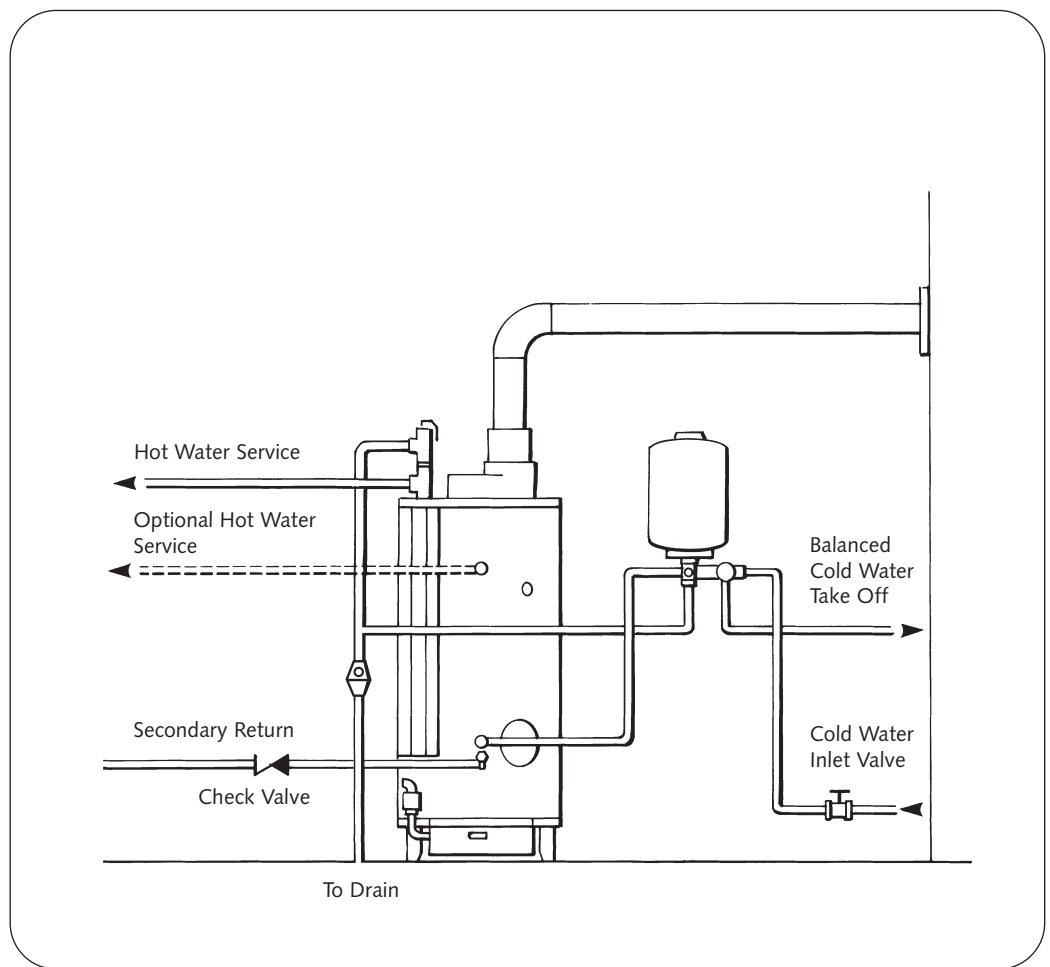


Fig 12.

CAUTION! DO NOT OPERATE THE WATER HEATER UNTIL THE STORAGE VESSEL IS COMPLETELY FILLED WITH WATER, WITH WATER RUNNING FROM ALL HOT TAPS.

Open the main gas supply cock after all connections to the gas control are completed and test all connections, using proprietary leak detection fluid.

Filling the Heater with Water

1. Close the water heater drain valve.
2. Open the cold water supply valve.
3. Open several hot water taps to allow air to escape from system.
4. When a steady stream of water flows from the taps. the heater is filled.
5. Close the taps and check for leaks at the drain valve, temperature/pressure relief valve and the hot and cold water connections.

Draining Water from the Heater

If it becomes necessary to drain the heater, follow the steps below.

1. Depress control panel rocker switch to the OFF position (see Operating).
2. Rotate and partially depress gas control knob clockwise to OFF position.
3. Shut off the gas supply to the heater.
4. Close the cold water supply shut-off valve.
5. Open the drain valve on the water heater.
6. Open a hot water tap to allow air to enter the system.
Refill the water heater as described above.

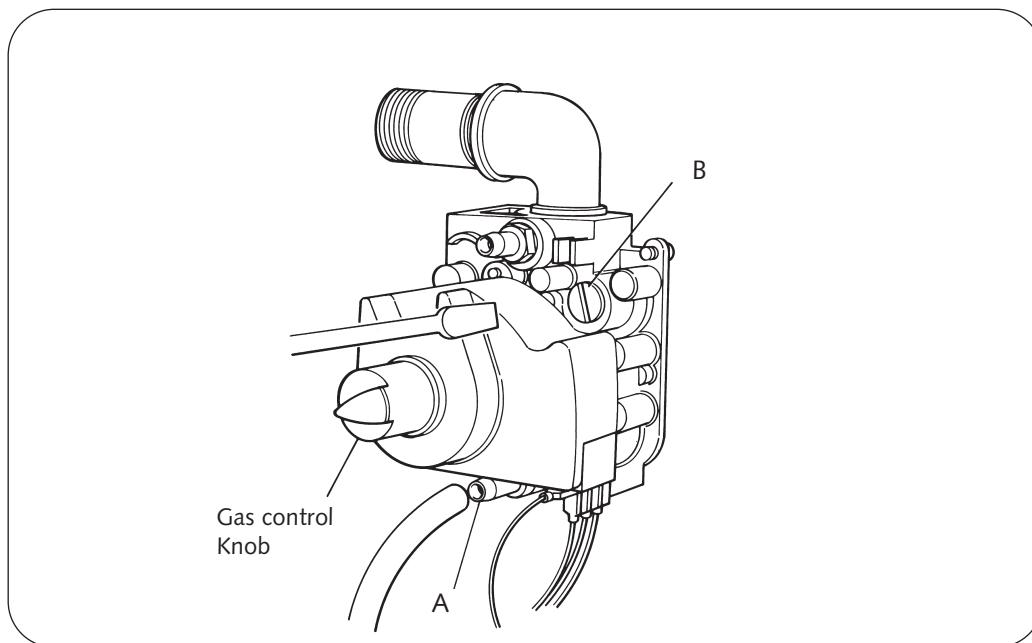
Lighting the Burner

1. Ensure gas supply is ON.
2. Turn gas control knob to ON position.
3. Using control thermostat, select required water temperature.
4. Move electrical ON/OFF switch to ON. After a delay of about 10 seconds, the burner will light.
5. Check pilot and main gas connections at gas control valve using leak detection fluid whilst burner is alight. Turn off, seal any leakages, then re-test.

Shutting Off The Burner

1. For long periods only, (7 days or more) move electrical ON/OFF switch to OFF, then turn gas control knob to OFF. Turn off gas service cock. For shorter periods, leave heater under thermostat control.

Fig 13.



Checking Main Burner Pressure

1. Turn gas control knob to OFF.
2. Release bleed screw (A) and connect pressure gauge tube to port (A).
3. Light burner as described previously.
4. Remove valve cap from port (B) and adjust pressure using exposed screw in accordance with data plate. Turn screw clockwise to increase pressure and counterclockwise to decrease. If possible, check gas rate (see Technical Data) with meter and watch. Refit valve cap to port (B).
5. Turn gas control to OFF. Remove pressure gauge tube and tighten bleed screw (A).
6. Turn gas control knob to ON and light burner as described above.

Checking Pilot and Burner Flame

1. Visually check that pilot and burner flames are burning properly.
2. The main burner and pilot flame may be viewed through the viewing window on the front of the combustion air box.
3. Adjustment to the air shutter setting is not normally required for the heater.
4. Some LPG models may be factory pre-set with the burner air shutters closed most of the way.
5. The burner flames should be blue with yellow tips.
6. A blue/orange flame is characteristic of LPG operation.

If the burners resonate (produce an harmonic noise and vibration, usually with LPG gas), close down the burner air shutters until the resonance stops. The resonance during burner operation should only be checked with the front panel held in place, since resonance may be more pronounced with the front panel off. Ensure flame appearance is satisfactory after adjusting the burner air shutters as described above.

IMPORTANT! IN THE EVENT OF AN EMERGENCY, TURN OFF GAS AND ELECTRIC SUPPLY.

For your safety read before lighting the appliance.

USER'S SAFETY GUIDE

WARNING

1. Always follow manufacturer's instructions when lighting the appliance. Failure to do so may result in damage to property, personal injury or loss of life.
2. Before lighting, check all around the appliance area for gas. Be sure to check at low level because some gas (i.e. LPG) is heavier than air and will settle on the floor.
3. Do not make any attempt to re-light the appliance if the main burner has extinguished. Wait at least 5 minutes to allow for any unburnt gas to disperse. Ventilate the area if possible.

FOR YOUR SAFETY IF YOU SMELL GAS

1. Turn off gas supply and open windows.
2. Do not operate electrical switches.
3. Extinguish any naked flames.
4. Contact gas supplier if the smell of gas persists.

FOR YOUR SAFETY

Do not store or use petrol, aerosol or other flammable vapours or liquids in the vicinity of this or any other atmospheric gas appliance.

WARNING

Hotter water increases the risk of scalding. Before changing the temperature, refer to the instruction manual or data label. Hot water can produce third-degree burns in:-

- 6 seconds at 140°F (60°C)
- 30 seconds at 130°F (54°C)

When properly installed and adjusted, the heater will require minimal attention. Should it become necessary to completely drain the heater, follow instructions given in Section 4, Commissioning.

Whenever the heater is filled with cold water, condensation will form on the storage vessel surfaces when the burner is lit. This is normal and will disappear when the heater warms up.

Operating Sequence

1. When the control thermostat senses too-cool water, a signal is sent to the control sequence unit.
2. When the pilot solenoid opens, gas is allowed to pass to the pilot and simultaneous ignition begins?
3. When the pilot flame is established, the main gas solenoid is allowed to slowly open and the main burners or burner is lit.
4. When the control thermostat is satisfied, both pilot and main gas solenoids are closed.

ECO (Energy Cut-Off)

The heater is equipped with an ECO (Energy Cut-Off) device, fitted to the control thermostat. It is a temperature sensitive switch which opens at high temperature, shutting off gas to the burners, including the pilot in an overheat condition. When the water has cooled sufficiently, the manual reset on the ECO needs to be depressed to allow the heater to be re-lit. If the pilot goes out and is associated with high water temperature, the ECO is probably operational and the cause of overheating should be investigated.

Temperature Stratification (Stacking)

When small amounts of hot water are drawn repeatedly, the thermostat responds to each feed of cold water and activates the main burners. Each time this occurs, more heat may be put back in the tank than was drawn off. As this continues, water in the upper level of the tank gets hotter than the thermostat setting. This hotter water does not mix completely with the cold inlet water, but rises in a 'chimney effect' to the top of the tank. Many repetitions of this over a short time period results in accumulation of excessively hot water in the upper part of the tank, even when the thermostat control is within limits. This is known as stacking.

To counter this condition, an upper thermostat phial is fitted which senses abnormally hot water and shuts down the main burner until the water cools. Most modern commercial pipe installations include a circulating pump which keeps hot water moving continuously throughout the heater. This stabilises temperatures in the water heater tank and throughout the pipe system.

Servicing must be carried out by a properly qualified person.

Whilst giving these instructions for the care of the Heater, it is recommended that checks are carried out by the installer or local gas authority, at least annually. Ensure good ventilation by keeping the heater free of extraneous materials and clear of dust and lint. Keep pipework, flue and tops of heaters clear of any combustible materials. A water softener or lime inhibitor should be employed in hard water areas. The heater should be inspected every few months via the hand hole cleanout and lime or silt deposits removed. Failure to do so will shorten heater life and may invalidate the warranty.

NOTE! The cleanout hole gasket must be renewed whenever the cover is removed.

Before servicing, carry out the following operations.

- 1) Turn off the gas service cock.
- 2) Turn off the cold water supply to the heater.
- 3) Turn on the hot water draw-off taps served by the water heater, or, for multiple installations, turn off the hot water outlet connection valve and secondary return valve.
- 4) Drain down using the drain valve on the heater.

Annual checks of the ignition systems, temperature controls and any other controls are necessary to ensure continued safe and efficient operation.

The entire combustion system must be sealed for this water heater to function correctly. Ensure that the burner access panel is kept tightly sealed. The combustion air supply pipe at the rear of the heater must be tightly clamped to the vent adopter and combustion air box boot. Replace any damaged parts.

The entire venting system and combustion air supply must be inspected at least annually for integrity of all joints and gaskets.

BLOWER MOTOR BEARINGS

Every six months lubricate the blower motor bearings. Apply four drops of SAE 20 motor oil to the ports of the front and rear motor bearings.

INTRODUCTION

PRE-SERVICE OPERATIONS

ANNUALLY

SIX MONTHLY

BURNER ASSEMBLY

Annually, remove the main burner rack assembly to clean orifices and related parts of any dirt or other foreign matter. Inspect the burner ports for obstructions or debris and clean with a wire brush, vacuum, or use a mild detergent to clean as necessary. Inspect the pilot. Carefully clean the electrode and flame sense rod with emery cloth. The spark electrode (rod closest to the pilot hood) gap should be 1/8 in.

NOTE: It is vital for proper and safe operation that the main burner rack is replaced in its original position.

To remove the burner rack assembly, follow the procedures outlined below.

- a) Shut off the gas and electrical supply to the heater.
- b) Remove the pilot tube fittings at the gas valve and combustion box.
- c) Disconnect wires to gas valve. Open control box and disconnect pilot spark and flame sense wires. Remove the wire raceway cover below the control box.
- d) Disconnect the gas pipe union below the gas valve.
- e) Remove the three screws securing the gasketed manifold pipe flange on the left side of the combustion box.
- f) Remove the burner access panel from the front of the combustion box.
- g) Carefully remove and push the pilot wire grommet into the combustion box with the pilot wires.
- h) Disconnect the pilot tube fitting on the inside bulkhead fitting of the combustion box.
- i) Unthread the gas pipe assembly from the manifold inside the combustion box.
- j) Remove the screw securing the burner rack on the top right panel of the combustion box.
- k) Slide out the burner rack assembly.

To re-install the burner rack, reverse the above procedures.

GAS CONTROL VALVE

The gas control valve should be checked and cleaned. Remove any debris from the valve inlet filter using a soft brush or by blowing with low pressure air.

After servicing, Check:-

1. Soundness of any gas joints broken or disturbed and seal any leaks.
2. Burner pressure/gas rate at maximum thermostat setting.
3. Operation of heater is correct. Reset controls to user's requirements.

MAGNESIUM ANODES

Magnesium sacrificial anode(s) is (are) fitted to the top of the storage vessel. The anode will prevent corrosion of the storage vessel. Anode condition should be checked annually and replaced if excessive wear is present.

1. Withdraw each anode using an $1\frac{1}{16}$ in AF socket spanner. A new anode measures 21mm diameter.
2. An anode should be replaced, if, at any point along its length, the diameter is reduced to half, or less of original. Particular attention should be paid to the ends.
3. If the anode is encrusted with limescale, it should be either wire brushed to reveal bright metal or replaced.

Where Correx™ anodes are fitted, no maintenance is necessary.

Check the condition and operation of this component at least once a year to ensure it is free from limescale deposits.

Lift the lever at the top of the valve several times until the valve seats properly without leakage and operates freely.

Clean or replace as necessary.

COMBINED TEMPERATURE AND PRESSURE RELIEF VALVE

The storage vessel should be checked and cleaned annually

Scale formation in the base of the vessel may occur, particularly in hard water areas and is normally associated with high usage and high water temperatures. It is characterised by a rumbling noise when the main burner is lit. Scale formation in the base of the vessel will affect the efficiency of the water heater and reduce the life of the storage vessel.

It should be noted that the failure of the storage vessel due to scale formation on the base will not be covered by the terms of the warranty.

Any scale formation which cannot be removed by normal means of cleaning should be removed by chemical descaling. See below.

CLEANING THE STORAGE VESSEL

Descaling

When descaling the heater, attention is drawn to the following guidelines.

CAUTION!

DUE TO THE CORROSIVE NATURE OF DESCALING FLUID, IT IS ESSENTIAL THAT SUITABLE PROTECTIVE CLOTHING IS USED AND ADEQUATE VENTILATION AVAILABLE.

1. Turn gas control to OFF and isolate gas supply.
2. Close water inlet valve and drain heater tank.
3. Remove magnesium anode(s). It is recommended that new anode(s) is (are) fitted.
4. Add suitable hydrochloric acid based descale fluid. The requirement is normally 10 litres or more dependent on amount of limescale present.
5. After a minimum of one hour, restore gas supply and turn on main gas burner for 2 minutes maximum.
6. Isolate gas supply and drain descale fluid through drain port.
7. Open cold water feed valve and fill heater tank.
8. Drain and flush out heater for 20 minutes minimum.
9. Replace anode(s).
10. Restore gas supply and re-light heater.

IMPORTANT

Remove Correx™ anodes if fitted and plug off the connections using 3/4" BSP plugs. Re-fit the Correx™ anodes when the descaling operation is complete.

Re-light and carry out commissioning checks as detailed in Section 4, Commissioning. Set the thermostat control to the required user setting.

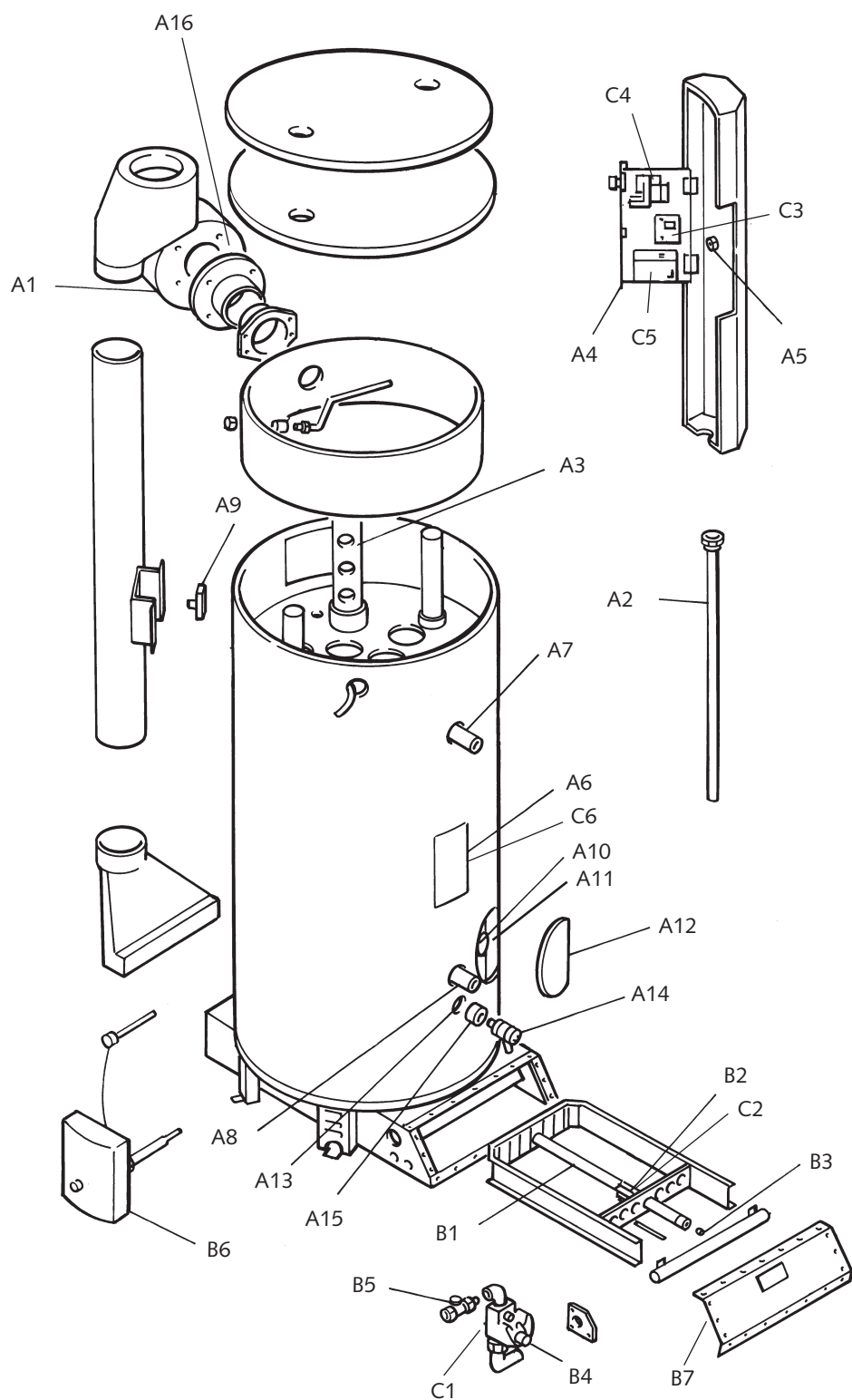
RESTART

FAULT	ACTION
WATER DOES NOT GET HOT	(a) Check gas service cock is open. (b) Check water valves are open. (c) Check thermostat setting. (reset to higher temperature)
HEATER SOOTING, YELLOW FLAME (POOR COMBUSTION)	(a) Check gas burner. If possible, check heat input with meter and watch. (b) Clean burners and injectors. (c) Flue obstruction. Clean flue ways. (d) Check flue and termination position. (e) Check for correct ventilation.
WATER TEMPERATURE TOO HIGH	(a) Reset thermostat to lower temperature. (b) Thermostat faulty. Check and replace if necessary. (c) Main gas valve not closing. Clean or replace.
NOT ENOUGH HOT WATER	(a) Check gas pressures at burner and at gas inlet to heater. (b) Check amount of water being used against recovery rate given on data plate. If usage too high, more heating capacity needed.
WATER DRIPPING FROM BASE OF HEATER	(a) Check if this stops when water in heater is hot. If yes, then condensation is the problem caused by incorrectly designed flue or by tank cooling excessively, i.e. more hot water being used than recovery rate of heater. If so, more heating capacity needed. (b) If water continues to drip when heater is hot, problem is leaking joint or storage vessel.

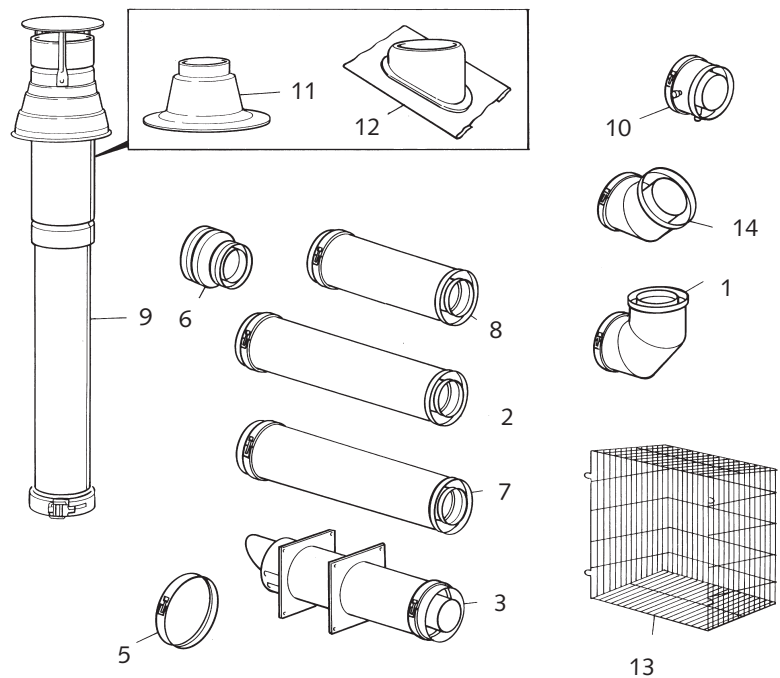
FAULT	ACTION
RUMBLING NOISE	(a) Scale formation in heater, consult water treatment specialist. Heater must be descaled and suitable water treatment provided to avoid re-occurrence.
CONTINUOUS IGNITION NO PILOT FLAME	(a) Check gas service cock is open. (b) Check gas control knob is ON. (c) Check ECO for failure.
PILOT LIGHTS BUT MAIN BURNER DOES NOT	(a) Main gas valve not energised. Check for loose contacts. (b) Check for 24V AC at intermittent pilot ignition. Replace control if faulty. (c) Check for 24V AC at main gas valve terminals. Replace valve if faulty.
NO IGNITION AT PILOT	(a) Electrical ON/OFF switch is not ON. (b) Thermostat set too low. (c) Power to unit interrupted.

SECTION 8

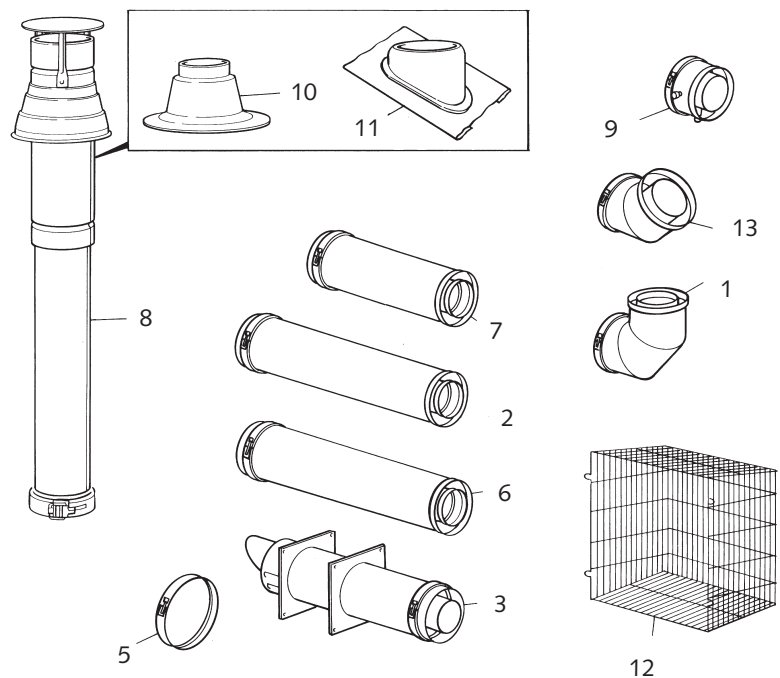
PARTS LIST AND ILLUSTRATIONS



Model Ref.	CSC39	CSC59	CSC78	CSC93		
	Part Numbers				Description	Qty
A1	E221	E221	E221	E221	Fan Motor Assembly	1
A2	E222	E222	E222	E296	Sacrificial Anode	4
A3	E223	E223	E223	E223	Flue Baffle	9
A4	C991	C991	C991	C991	Control Circuit Board	1
A5	C521	C521	C521	C521	On / Off Switch	1
A6	E193	E194	E195	E196	Data Badge Nat. Gas	1
A7	C534	C534	C534	C534	Nipple 1½" BSP	1
A8	E050	E050	E050	E050	Hydrojet Cold Inlet 1½" BSP	1
A9	E224	E224	E224	E295	Pressure Switch	1
A10	C299	C299	C299	C299	Cleanout Pad Seal	1
A11	C300	C300	C300	C300	Cleanout Pad	1
A12	C301	C301	C301	C301	Cleanout Pad Cover	1
A13	C247	C247	C247	C247	Drain Tapping Connector	1
A14	C381	C381	C381	C381	Drain Cock BS2879 ¾"	1
A15	C103	C103	C103	C103	Socket Coupler ¾"	1
A16	E346	E346	E346	E346	Fan Motor	1
B1	E225	E225	-	-	Burner bar	5
	-	-	E225	E225	Burner bar	7
B2	E226	E226	E226	E226	Pilot Assembly	1
B3	E227	-	-	-	Injector 2.4mm Nat. Gas	5
	-	E228	-	-	Injector 2.9mm Nat. Gas	5
	-	-	E228	-	Injector 2.9mm Nat. Gas	7
	-	-	-	E229	Injector 3.1mm Nat. Gas	7
	E230	-	-	-	Injector 1.65mm LPG	5
	-	E231	-	-	Injector 1.95mm LPG	5
	-	-	E232	-	Injector 1.90mm LPG	7
	-	-	-	E233	Injector 2.1mm LPG	7
B4	E234	E234	E234	E234	Gas Valve	1
B5	C498	C498	C498	C498	Gas Cock ¾" BSP FxF	1
B6	E235	E235	E235	E235	Control Thermostat with Remote Phial and ECO	1
B7	E386	E386	E386	E386	Combustion Box Cover	1
C1	E348	E348	E348	E348	Gas Valve Assembly complete with fittings LPG	1
C2	E349	E349	E349	E349	Pilot Assembly (PSE-43L) LPG	1
C3	E350	E350	E350	E350	Transformer LPG	1
C4	E351	E351	E351	E351	Relay LPG	1
C5	E352	E352	E352	E352	Ignition Control Jc G770 LPG	1
C6	E365	E366	E367	E368	Data Badge LPG	1



150mm (6in) Flue Kit



200mm (8in) Flue Kit

Ref.	Part No.	Description	Qty
1	E205	90° Elbow with Clamp	
2	E202	1 mtr Flue with Clamp	
3	E236	Horizontal Flue Terminal	
4	E209	Wall Clamp (Not Shown)	
5	E237	Large Stepped Adaptor Connection Clamp	
6	E238	200mm (8in) to 150mm (6in) Reducer	
7	E203	1 mtr Cuttable Flue with Clamp	
8	E204	0.5 mtr Flue with Clamp	
9	E239	Vertical Flue Terminal	
10	E210	Condensate Trap Tee	
11	E207	Flat Roof Plate	
12	E208	Angled Roof Plate	
13	E105	Horizontal Flue Outlet Terminal Guard	
14	E206	45° Elbow with Clamp	

150mm (6in)
Flue Kit

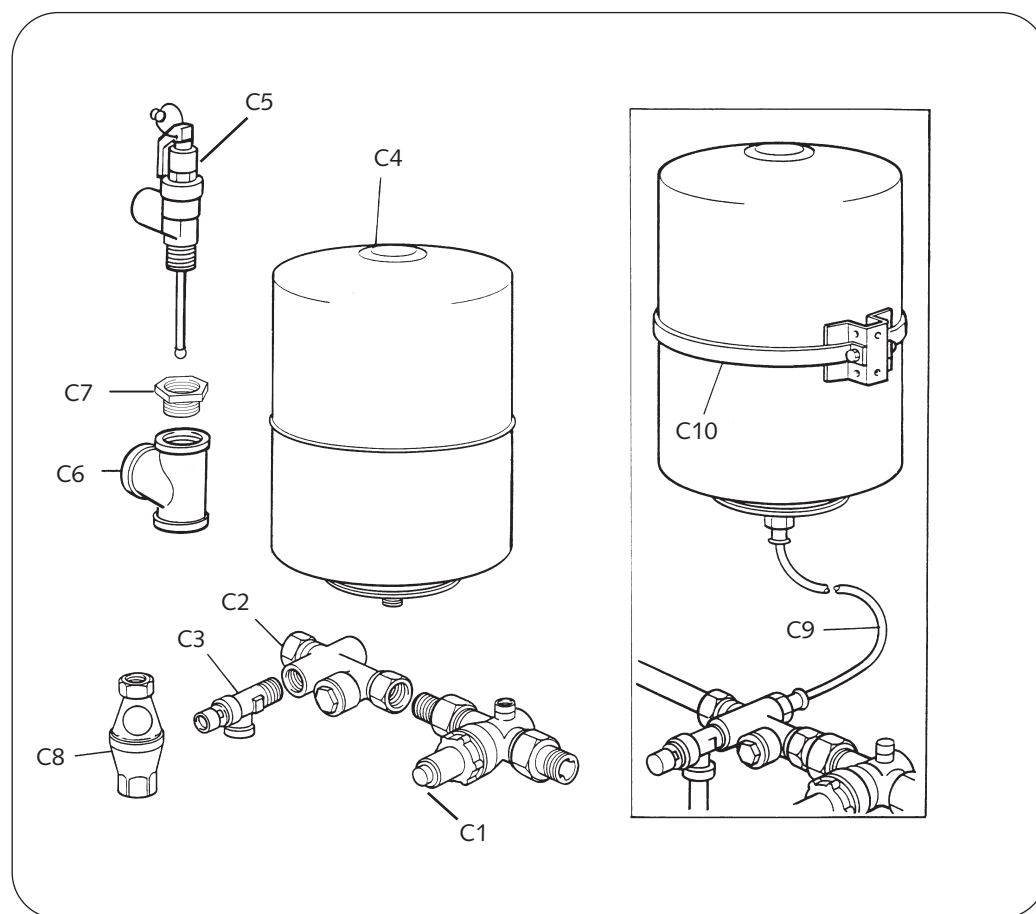
Note: Extra lengths of flue tubing can be supplied to suit each installation requirement.
Also extra 90° and 45° elbows can be supplied.

Ref.	Part No.	Description	Qty
1	E215	90° Elbow with Clamp	
2	E212	1 mtr Flue with Clamp	
3	E240	Horizontal Flue Terminal	
4	E219	Wall Clamp (Not Shown)	
5	E237	Large Stepped Adaptor Connection Clamp	
6	E213	1 mtr Cuttable Flue with Clamp	
7	E214	0.5 mtr Flue with Clamp	
8	E241	Vertical Flue Terminal	
9	E220	Condensate Trap Tee	
10	E217	Flat Roof Plate	
11	E218	Angled Roof Plate	
12	E105	Horizontal Flue Outlet Terminal Guard	
13	E216	45° Elbow with Clamp	

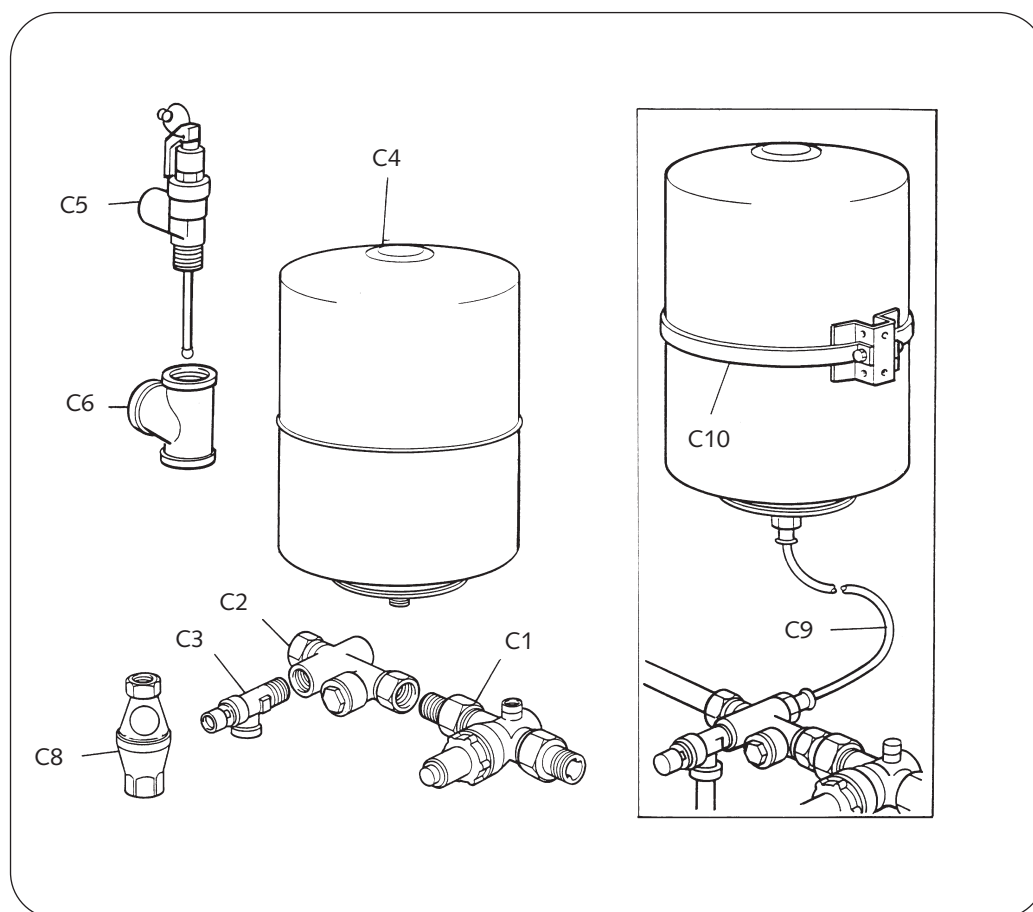
200mm (8in)
Flue Kit

Note: Extra lengths of flue tubing can be supplied to suit each installation requirement.
Also extra 90° and 45° elbows can be supplied.

A Terminal Guard Extension Part No. E424 can be supplied upon request.


Unvented System kit
CSC39 Parts List

Ref.	Part No.	Description	Qty
	B228	Unvented Systems Kit Complete	1
C1	C784	Combined Reducing Valve/Strainer	1
C2	C785	Check Valve	1
C3	C786	Expansion Valve	1
C4	C782	Expansion Vessel (25 Litre)	1
C5	C914	Temperature/Pressure Relief Valve 1"	1
C6	C856	1½" Square Equal Tee	1
C7	C911	1½" x 1" Reducing Bush	1
C8	C384	Tundish from Expansion Valve and T/P Valve	1
	B173	Wall Mounting Kit (Optional)	
C9	C788	Hose Assembly	1
C10	C787	Wall Bracket Assembly	1

**Unvented System kit****CSC59, 78 & 93 Parts List**

Ref.	Part No.	Description	Qty
	B248	Unvented Systems Kit Complete	1
C1	C784	Combined Reducing Valve/Strainer	1
C2	C785	Check Valve	1
C3	C786	Expansion Valve	1
C4	C782	Expansion Vessel (25 Litre)	1
C5	E242	Temperature/Pressure Relief Valve 1½"	1
C6	C856	1½" Square Equal Tee	1
C7	-	N/A	
C8	E236	Tundish from Expansion Valve and T/P Valve	1
	B173	Wall Mounting Kit (Optional)	
C9	C788	Hose Assembly	1
C10	C787	Wall Bracket Assembly	1